First, I would like to add my congratulations to all of the family members, friends, faculty and of course the graduates on this special day. And I would like to thank the University, College and Dean Grasso for offering me the opportunity to address you today.

One of the corollaries of having accumulated lots of degrees and of being a faculty member for so many years is that I have had the chance to hear dozens of commencement speakers, and I thought that surely would be of assistance in preparing to address you. Oddly, thinking back on all those commencement speakers, all that came to mind is that they seemed to speak too long and there was nothing particular that I could remember that they said. This of course turned out to be very reassuring because I thought I could do that easily – drone on endlessly and say things nobody will recall (I’m sure some of my students over the years would attest to this). But as the day drew closer, I found myself thinking more ambitiously (and keeping in mind that one of the greatest speeches of all time, Lincoln’s Gettysburg Address, was only two and a half minutes long), I decided maybe I would break with tradition and actually be brief but say something memorable (and I’m sure you will at least be thankful for the former if not the latter). Since this is an institution of higher learning, I want to say something about higher education in general and engineering education in particular. And the overarching theme that I would like you to consider is “engineering as a profession and the engineer as an agent of social justice”.

So let me start with a quote from someone who could be brief but memorable. Albert Einstein said, “The world we have made as a result of the level of thinking we have done thus far creates problems we cannot solve at the same level of thinking at which we created them.” You have all spent years acquiring a level of thinking about engineering and science and mathematics that operates on several ascending orders of understanding: you are well versed in the generation and collection of data, the analysis of data to create information, and the synthesis of information to generate knowledge. But higher education must not stop there – we must strive for another level of thinking that transforms knowledge into wisdom. After all, we say that the highest degree in higher education is the Ph.D. – the doctor of philosophy – from the Latin “to teach” and the Greek “a love of wisdom”. Wisdom requires that our evidence-based knowledge become embedded in a multi-dimensional ecosystem of understanding with other levels of thinking including a dimension of ethics-based values such as humanity, humility and honor. In other words, knowledge requires an ethic to be used wisely.

This is the point where those of you who are still listening will be saying to yourself, “I don’t care about that ethics stuff – if I’m as technically proficient as I can be, I have done my job.”
My answer to that is do you think of yourself as a technician or a professional? Take engineering, for example, which is defined in one dictionary as “the application of science by which matter and energy in nature are made useful to people.” I’m sure you all agree that you should be proficient in “applying science to transform matter and energy”, but the rest of the definition is equally important, namely, in a way that is “useful to people”. The decision about what is truly useful is a value judgment – about what is good or bad, in other words, it requires incorporation of an ethics-based dimension as well as an evidence-based dimension in your framework of understanding. The linear dimensional framework of technical thinking (at which engineers excel) must be embedded in a multi-dimensional framework in which one of the other orthogonal axes is ethics. The technical engineer stops at the linear thinking part, but the professional engineer operates in the larger framework. We all talk about the engineering profession (in fact, in every state you can earn the legal credential of professional engineer), but what does being a professional mean? One thing it means is that not only have you been privileged to acquire specialized skills and knowledge, but also that you recognize that that privilege comes with responsibilities, one of which is to use the skill and knowledge wisely, in a way that is useful to people. Some of the engineers of the prior generation who designed and built the gas chambers for the concentration camps made them technically very efficient, but it would be difficult to say that they used their knowledge wisely or that they acted professionally.

The challenge for the current generation of engineers is to accept your professional responsibilities and act wisely, tempering your technical prowess with ethics. This is the “new level of thinking” that is needed to solve the problems created as a result of the level of thinking we have done thus far. This old level of thinking has made a world that is profoundly technologically efficient in a way that is equally profoundly unjust and unsustainable. We have become so technologically proficient at manipulating matter and energy in nature to create and maintain the over-sized ecological footprint of our Western lifestyle that we have condemned a significant fraction of this generation to extreme poverty. Just as an example, consider that the average ecological footprint of the typical American is 5x that of the world average if all resources and ecosystem services were distributed equally around the globe and it is 15x that of the average ecological footprint of a typical citizen of the third world. And the solution is not merely one of making our current level of thinking about technology available to the rest of the world so that they can pursue our way of life; we have already exceeded the earth’s carrying capacity with this level of thinking, and it would require at least 4-5 planet earths to do the same for the whole world’s population (and good planets are hard to find), which would only mean condemning future generations to global ecologic catastrophe. We need a new level of thinking that recognizes that technological efficiency in the service of the privileged few of this generation is unwise because it is unjust to the rest of humanity alive now and yet to be born.

We must all change our level of thinking, but you, as professionals with your specialized skills and knowledge, should show the way, can show the way, must show the way. Living up to your professional responsibility is not just about knowing but about caring because in the end “people will not care how much you know until they know how much you care.”

So there’s a lot of work ahead of you, and it’s time is running short so you’d better get started. That’s why today is a commencement – it’s really just the start. And, by the way, Dean Grasso may have failed to mention the bad news – although you will be receiving your diplomas today,
you must pass one final exam before you fully deserve them. The good news is that it’s a take-home exam, you get to grade it yourself, and you have a life-time to complete it. If in 40-50 years at the end of your professional career you can look at yourself in the mirror and truthfully say that you’ve used your knowledge wisely to build a better world for all, then you will have earned your degree.

So go build a better world. We’re all counting on your wisdom.